Relay TCP

Socket Forwarder v 1.0
DLC Sistemas 2000

Installation and Administration Guide

Contents

What is Relay TCP

Relay TCP is a service program that allows redirection of TCP/IP sockets stream data to a specific IP address and port.

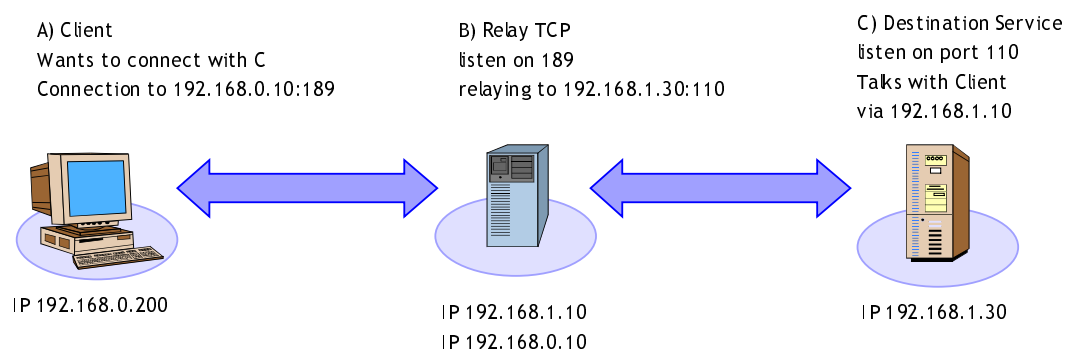It works like a repeater that gets all data received by the origin port and sends it to the destination.

How it works

In the following example we can see how works:
Here we have tree boxes. A) is a client that wants to connect to the POP3 service on the C) box. Note that A) cannot connect directly because it belongs to a different IP subnet.

There is an intermediate box that has not IP forwarding installed neither rules to route, but has the capability to route data from the port 189 and route it to the port 110 of the C) box. (That's by the configuration of Relay TCP)

Then the client can comunicate with the server by connecting to the relay TCP service on machine B)

A) Client
Wants to connect with C
Connection to 192.168.0.10:189

B) Relay TCP
listen on 189
relaying to 192.168.1.30:110

C) Destination Service
listen on port 110
Talks with Client
via 192.168.1.10

IP 192.168.0.200

IP 192.168.1.10
IP 192.168.0.10

IP 192.168.1.30

The following considerations are interesting to remark:

- Multiple connections can be established to the port on B) box from different clients.
- When any of the peers close the corresponding connection the other side is closed by RelayTCP
- The data is not modified but only redirected.
- The data from Client is sent to the Destination Service, and the data from the Service is sent to the Client.

Program versions

There is two versions that have basically the same functionality:

- Relay TCP (RELAYTCP.EXE)
- Relay TCP Service (RETCPSVC.EXE)

Relay TCP is a command line tool that allows to relay from a single port and redirect all data to a remote IP and port.

Relay TCP Service is a Service for Windows NT 4.0 and 2000 that allows to listen and redirect from multiple ports and redirect data as explained.

Both are 32 bits Windows versions, but Relay TCP is only for NT.

RelayTCP command line tool

Relay TCP is a command line tool that allows to relay from a single port and redirect all data to a remote IP and port.

Installation

Is a unique file RELAYTCP.EXE that has no installation. Simply use it as a command line tool.

Usage

From a Win32 command prompt, you can execute RELAYTCP by using:

RELAYTCP *listenPort remoteIP remotePort [–d]*

Where

listenPort	Is the local port where RELAYTCP will listen to accept connections. This port must be not used in order to open the listening socket
remoteIP	Is the IP address in name or number format that will be the destination of the data received by the other side connection
remotePort	Is the port where RELAYTCP will try to open the connection and send/receive data
–d	Is optional. With this flag the program will log all the data transmited from both sides and recorded in formatted files, a file for each connection

An example

We want to send mail to the SMTP service (port 25) at 10.3.100.14.
We cannot access directly because we have no route to there, but there is a multihomed Windows 95 with IPs 192.15.1.10 and 10.3.100.12 that can.
We can just execute RELAYTCP command line in that box in the following form:

RELAYTCP 25 10.3.100.14 25

Or, if we desire another origin port (i.e. port 1000),
RELAYTCP 1001 10.3.100.14 25

Then we will get a message like:

```
RelayTCP v1.0 - Relay of TCP/IP sessions
(C) DLC Sistemas 2000 - www.dlcsistemas.com
```

```
Listening on port 1001
Ready to relay data to 10.3.100.14:25
[ESC to cancel]
```

We can now connect to 1001 of the 192.15.1.10 box and we will get the SMTP service of 10.3.100.14

Note that this multihomed host can accept connections on port 1001 from 192.x.x.x and 10.x.x.x clients.

To stop, just press ESC key. Then the utility will stop:

```
RelayTCP v1.0 - Relay of TCP/IP sessions
(C) DLC Sistemas 2000 - www.dlcsistemas.com
Listening on port 1001
Ready to relay data to 10.3.100.14:25
Closing connections...
It's all !
```
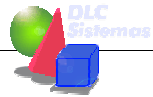
Error Events

There can appear some errors that we'll try to describe:

Not bound to port !	Is shown when the local port assigned to listen is used by another application or system. Use another port
I can't resolve *XXXX*	Is shown when the IP name address *XXXX* couldn't be resolved by any DNS or hosts file. Try to do ping on this address to test what's happend
Fatal Error: No socket support seem to be installed. :-(	When the operating system has not the TCP/IP protocol installed or there is any kind of problem with the version of winsock
Fatal Error: No resources were assigned to the process :-(	That's when the program cannot get memory from the OS and open objects
Fatal Error: Thread not allowed to begin :-(	That is when the thread resources of the OS have been exhausted

Data logging

When –d option is set, RELAYTCP will log all data transferred between peers and formatted in hexa and ascii data.

Each established connection will be logged in a file in the current working directory.

The use of this option is recommended only for debugging purposes. Extensive use of this functionality could affect performance and free disk space.

See *Data Logging* on *Relay TCP Service* chapter to view more details of these log files.

RelayTCP Service

RelayTCP Service is a service-style Windows NT program and integrated with the Event Logging.

These are the facilities this software includes:

- Multiple redirection to destinations
- Management as a compliant NT service
- Integrated with Event Log messaging
- Reporting of connections established
- Debug data option
- Configuration console program

With RelayTCP Service you can achieve a software-based NAPT functionality.

Installation and Configuration

Installing the software

The files included in the software are:

RETCPSVC.EXE	Relay TCP Service program
RETCPSVC.DLL	DLL Messaging file
RETCPADM.EXE	Console administration and configuration
INSTALL.CMD	Installation batch file
UNINST.CMD	DeInstallation batch file
SVCSETUP.EXE	Setup Service program
EVLSETUP.EXE	Setup Event Log program
README.TXT	Latest information

Copy all these files to a directory (i.e. C:\APP\RELAYTCP)
Run INSTALL.CMD in the following form:

INSTALL directory

Where directory is where you've copied the files (C:\APP\RELAYTCP). Is important to note that trailing backslash are not allowed.
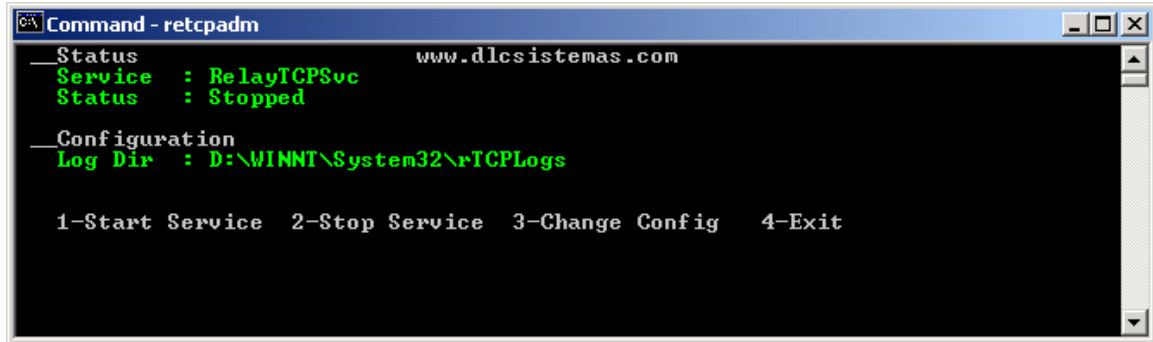
Then you will get a set of messages like this:

```
SVCSETUP v1.0 - Service Installation - www.dlcsistemas.com
Service Relay TCP Service created successfully
EVLSETUP v1.0 - EventLog Setup - www.dlcsistemas.com
Events for RelayTCPsvc are now ready into the Application log
```

Installation and Admininstration Guide   Page 8

You have now the program installed. Let's go to configure settings.

Basic Configuration
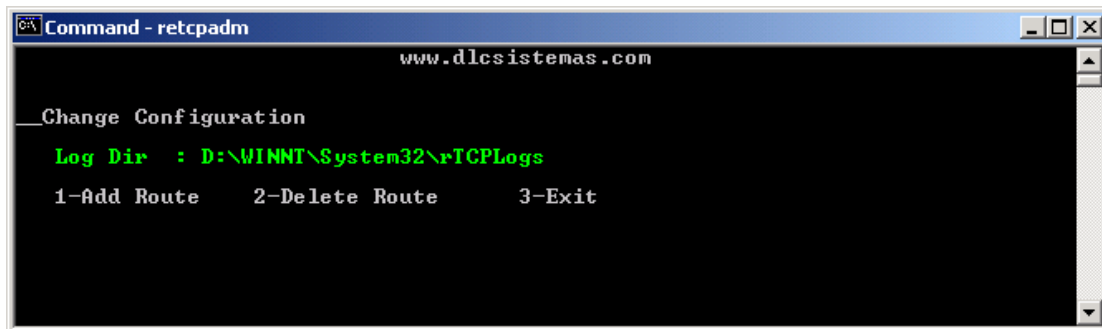
Now it's time to configure settings. To do so you must run RETCPADM.EXE. You will get a screen like this

If in Status you have (invalid Service) instead of Stopped, that means that the installation process had any problem. In this case, please exit ('4' key) and repeat the procedure.

Now press '3' key to change configuration.

You have now the Change Configuration screen, and you can add or delete routes. Let's include first route:

- Press '1' key
- Enter the local port (i.e. 155) and press Enter
- Enter the remote IP address (i.e. 192.168.1.200) and press Enter
- Enter the destination port (i.e. 110) and press Enter

Now you get the new line redirection as you have indicated:

Then you can get the POP3 service of the 192.168.1.200 box by connecting to the RelayTCP machine on to the 155 port.

By acting like this for tree more routes, you will get, as an example:

If you want to delete any route, follow these steps:

- Press '2' key,
- Enter the route number you want to erase and press Enter

Press '3' exit when you're ready

Now you have finished the basic configuration and the service is ready to run.

If you want to change advanced configuration, like log directory or debugging options, you must see *Advanced Configuration*. If not, you can go directly to *Managing the Service*.

Advanced Configuration

There is two options that you cannot change by using the Relay TCP Administration program: log directory and debug.

The Log directory is the path where connection information file and data files will be created. By default, directory rTCPLogs will be created in the %SystemRoot% directory.

The debug is a flag that indicates that all data will be logged as a formatted text and value in a file. See *Data Logging* for more information.

To change these settings you must access into the registry. Follow this steps:
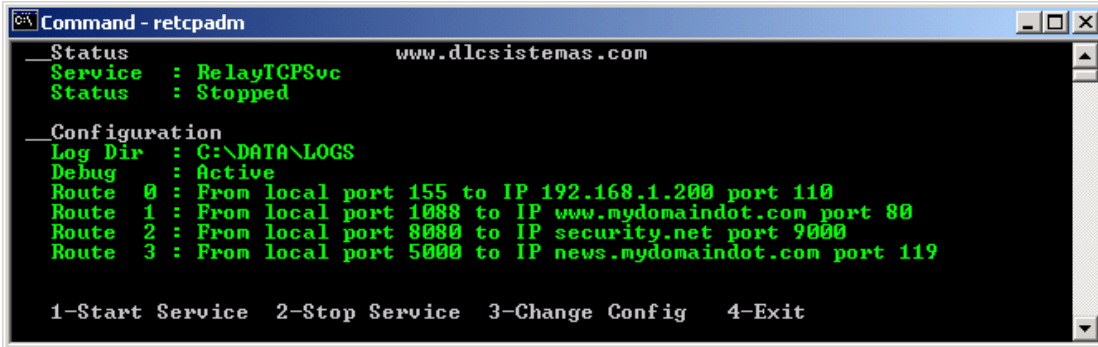
- Open the registry by running REGEDIT.EXE
- Go to the key HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\RelayTCPsvc
- Open the Parameters key
- Go to the menu, Edit | New | String Value
- Enter LogDir, press Enter and double-click above to set the data (i.e. C:\DATA\LOGS)
- Also go to the menu, Edit | New | String Value
- Enter Debug as name, press Enter and double-click to edit, and put 1
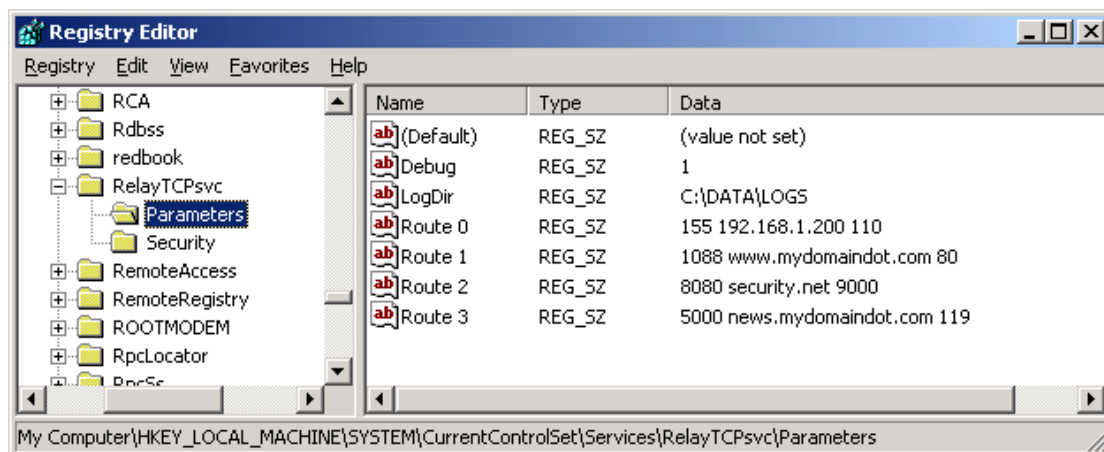
If you want to deactivate debugging, edit the Debug value and put 0 or delete the field.

Note that in the Parameters key you have all the configuration you've inserted by the Administration program.

Close the registry editor and run now RETCPADM.EXE. You will get this screen and you can check that options you've modified are recognized by the program. If the administrator program cannot see any option you've set, review the operations.

What does the Installation program ?

This paragraph explains what does the INSTALL.CMD program. It's a useful information for any server administrator that must know how work all programs in their servers.

There is two utilities SVCSETUP.EXE and EVLSETUP.EXE used here to install the service and set the event parameters. In order to get more information of these utilities, go to www.dlcsistemas.com/products

SVCSETUP creates a new service RelayTCPsvc and sets the description of the service. This means that the key HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\RelayTCPsvc is created with the corresponing values.

Also is created within the RelayTCPsvc key, a Parameters key that will contain all parameter information the application will need.

EVLSETUP sets the message file to the Event Log service of the Relay TCP application. The key HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\EventLog\Application\RelayTCPsvc is created and EventMessageFile and TypesSupported values are set.

Uninstalling

To uninstall the service:

- Make sure the service is not active.
- Close the Event viewer and the Services applet if these applications are running
- From the command line, go to the RelayTCP directory
- Execute UNINST.CMD

You will get a set of messages like this:

```
SVCSETUP v1.0 - Service Installation - www.dlcsistemas.com
Service RelayTCPsvc removed successfully
EVLSETUP v1.0 - EventLog Setup - www.dlcsistemas.com
Event log for 'RelayTCPsvc' was successfully removed from Application
log
```

Erase the directory of the program.

Note that in this uninstallation data log and connection files are not removed. You have to delete the log directory manually (If you have not set any Log directory, erase the default dir that is %SystemRoot%\rTCPLogs, where %SystemRoot% is commonly C:\WINNT\System32)

Clustering and Relay TCP

You can use Relay TCP Service in a Microsoft Cluster environment.
Clustering supplies more availability to Relay TCP service because restarts it on failover. Note that established client connections are not recovered.

These explanations are to setup Relay TCP in a MsCluster 1.0

Let's say the boxes A and B:

- Install the Relay TCP Service as above explained on servers A and B, on the corresponding local disk (C:), at the same directory (i.e. C:\APP\RELAYTCP)
- Configure first all routes at server A.
- After, do the same on server B.
- At server A, change the destination log directory by accessing the registry as explained above, to set a shared clustered disk and directory (i.e. K:\RELAYTCP\LOGS, where K: is a clustered disk).
- Do exactly the same things on server B.

Now the services are installed at both machines. Let's configure the cluster service:

- Open the cluster administrator. Check both servers are active and running.
- Select the cluster group where the clustered disk specified for the logs belongs. If the clustered disk is new or is not integrated within a group, create a new cluster group.
- Within this group, create a new virtual IP address (i.e. called IPRelayTCP) and set a new IP. If there is not new IP availables or you don't want a new IP address, you can use any IP within the group.
- Create a Generic Service resource and indicate RelayTCPsvc as name. Set this service as depending on the cluster disk and the IP address referred above.

- Specify the cluster recovery parameters you would for the service. Note: if you share the cluster group with others resources, is important to deactivate the *switch group on fail* before doing the firsts tests.

Test now the service by starting it:

- Start the service via the Cluster Administration on server A. Review the Event Log to check the status.
- Promote the other server for the group (note that all services of the group will be restarted).
- Wait to the end of start. Review the logs.
- Promote back to the server A. Same operations.

Then you have now the services on cluster and the logs in the same location without care about which box runs the service.

The RelayTCP will bind to the virtual IP created or the existing IP associated with.

To uninstall the service on cluster:

- Open the Cluster Administration and check both servers are running
- Stop the Relay TCP Service via the Cluster Administration
- Delete the Generic Service RelayTCPService
- Delete the created IP address associated with only if it's the unique service that depends on it.
- Uninstall the service with UNINST and delete the program directory in both servers.
- Delete the log directory.

Managing the Service

Once the service is installed and configured, it's time to start.

There are three ways to manage the service:

- Using the Administration program RETCPADM.EXE
- Using the NET command line
- Using the Services Applet

Using the Administration program

Press '1' key to start the service, '2' key to stop.
The Status field will indicate the current status of the service.

Using the NET Command line

From a command prompt console, use:

NET START RelayTCPsvc	To start the service
NET STOP RelayTCPsvc	To stop the service

Don't use NET PAUSE nor NET CONTINUE with this service.

Using the Services Applet

Run Start | Programs | Administrative Tools | Services or run Services on Control Panel.
There is a list of installed services. Look for Relay TCP Service and select it.
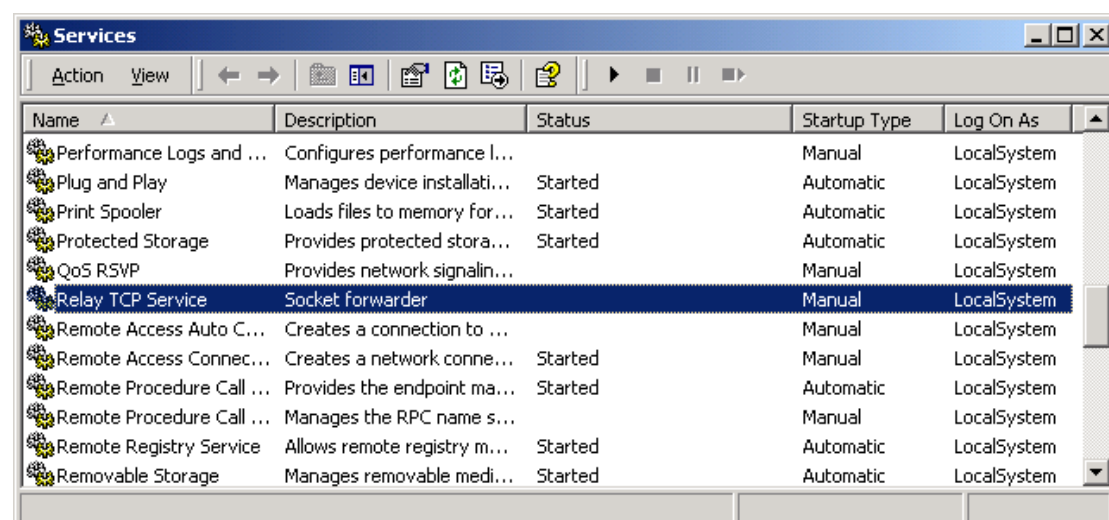
To start the service do Action | Start
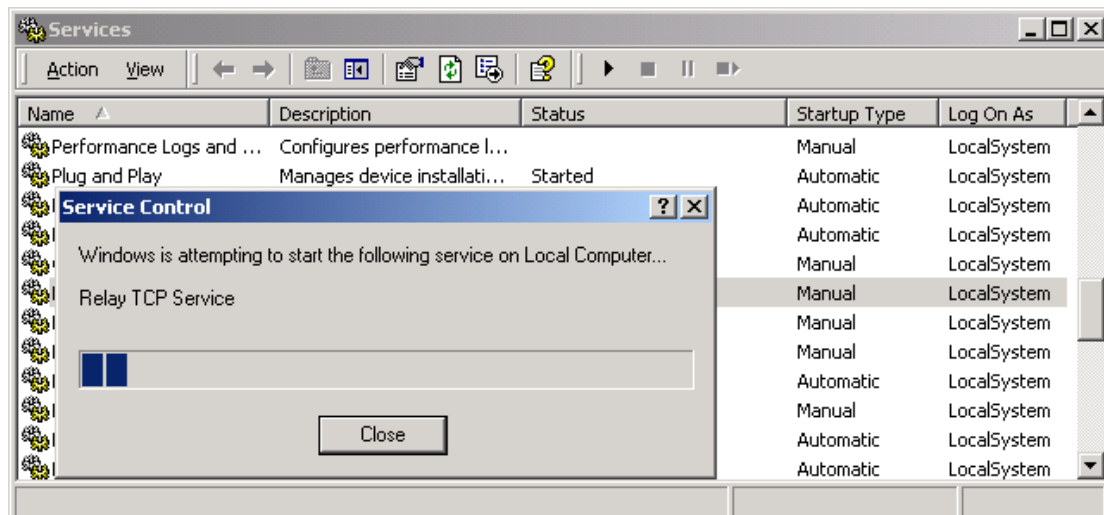
To stop, go to Action | Stop.
The Pause and Continue actions are not allowed.

Event Logging

State change of the service is recorded into the Application Event Log. There is two types of Event Id:

- Event ID 100: Notification of change of status of the service or fatal errors when doing running up or shutdown.
- Event ID 101: Notification of status of relays configured, errors or problems encontered.

To view the log messages, go to Start | Programs | Administrative Tools | Event Viewer, and select the Application log.
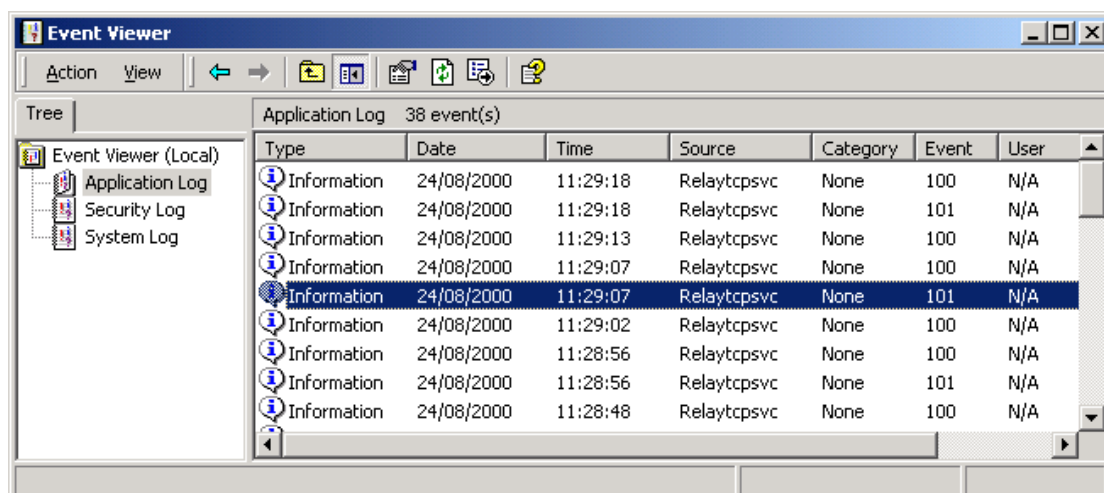
The possible events are:

Event ID 100

Message	Message Type	Description
The Relay TCP Service was successfully started	Information	Service up and running
The Relay TCP Service was successfully stopped	Information	Service down
There is no routes to relay. The Service is stopped	Error	There was no routes in the configuration, and the service shutdown
The Relay TCP Service cannot be paused	Warning	The service received a control to pause. This is not allowed (the service doesn't do pauses)
There was error *XXX* when trying to start the Relay TCP Service	Error	When starting, the internal error XXX has been raised. Try to restart the service, but if you get same error many times, let us know.
The Relay TCP Service couldn't get socket support	Error	The system has not TCP/IP installed or dependent services are not running. Please check the OS configuration.

Event ID 101

Message	Message Type	Description
The Relay TCP Service is ready to get data from local port *PPP* and relay to *XXX:YY*	Information	The service has been started and the relay to IP:port *XXX:YY* is up
The Relay TCP Service couldn't bound port *PPP* to relay to *XXX:YY*	Error	Port *PPP* is used by another service or application. Change the listening port or stop the process that has it.
The Relay TCP Service couldn't resolve *XXX* IP address. This relay cannot be done.	Error	The IP name *XXX* cannot be resolved by the hosts file or DNS servers available. Then the relay affected cannot be activated. Try to do pings to check what's matter with your TCP/IP configuration and routers
The Relay TCP Service couldn't get resources to relay to *XXX:YY*	Error	The process cannot get memory to create objets to manage the relay. Please check the NT status and at final, run the service onto another box.
The Relay TCP Service couldn't start a thread to relay to *XXX:YY*	Error	The process cannot deliver resources to start a thread to manage the relay. Please check the NT status and at final, run the service onto another box.

Connection Logging

When service is up and running, all established connections will be reflected in a summary file located at the Log directory.

This file has the format

CO*yymmdd*.LOG

Where

yy	Two last digits of the current year
mm	Current month
dd	Current day

There is a file each day. Log entries are appended to the file until next day. Then, a new file is created.

Data collected is like this:

```
2000/08/20 00:18:35 Connection from 127.0.0.1:4356 to 192.168.1.3:23
2000/08/20 00:18:42 Connection from 127.0.0.1:4868 to 127.0.0.1:23
2000/08/20 00:20:32 Connection from 127.0.0.1:7940 to 192.168.1.3:21
2000/08/20 00:20:54 Connection from 127.0.0.1:8708 to 192.168.1.3:80
2000/08/20 00:20:55 Connection from 127.0.0.1:9220 to 192.168.1.3:80
2000/08/20 00:21:41 Connection from 127.0.0.1:9732 to 192.168.1.3:80
2000/08/20 00:21:41 Connection from 127.0.0.1:10244 to 192.168.1.3:80
```

First there is the date and time, then the source client and its calling port and the destination service.

Data Logging

When parameter Debug is set to "1" in the registry (activated), each established connection will be logged in a file at the Log Directory. The format of the file is

RL*yymmddhhttnn*.LOG

Where
yy	Two last digits of the current year
mm	Current month
dd	Current day
hh	Current hour
tt	Current minute
nn	A random number to set file as unique

The use of this option is recommended only for debugging purposes. Extensive use of this functionality could affect performance and free disk space.

A sample of contents of this type of file is shown below:

```
12:58:56 Packet from 192.168.1.13:54789 to 216.32.74.53:80
         47 45 54 20 2F 20 48 54 54 50 2F 31 2E 31 0D 0A   GET / HTTP/1.1..
         41 63 63 65 70 74 3A 20 69 6D 61 67 65 2F 67 69   Accept: image/gi
         66 2C 20 69 6D 61 67 65 2F 78 2D 78 62 69 74 6D   f, image/x-xbitm
         61 70 2C 20 69 6D 61 67 65 2F 6A 70 65 67 2C 20   ap, image/jpeg,
         69 6D 61 67 65 2F 70 6A 70 65 67 2C 20 61 70 70   image/pjpeg, app
         6C 69 63 61 74 69 6F 6E 2F 76 6E 64 2E 6D 73 2D   lication/vnd.ms-
         70 6F 77 65 72 70 6F 69 6E 74 2C 20 61 70 70 6C   powerpoint, appl
         69 63 61 74 69 6F 6E 2F 76 6E 64 2E 6D 73 2D 65   ication/vnd.ms-e
         78 63 65 6C 2C 20 61 70 70 6C 69 63 61 74 69 6F   xcel, applicatio
         6E 2F 6D 73 77 6F 72 64 2C 20 2A 2F 2A 0D 0A 41   n/msword, */*..A
         63 63 65 70 74 2D 4C 61 6E 67 75 61 67 65 3A 20   ccept-Language:
         65 73 0D 0A 41 63 63 65 70 74 2D 45 6E 63 6F 64   es..Accept-Encod
         69 6E 67 3A 20 67 7A 69 70 2C 20 64 65 66 6C 61   ing: gzip, defla
         74 65 0D 0A 55 73 65 72 2D 41 67 65 6E 74 3A 20   te..User-Agent:
         4D 6F 7A 69 6C 6C 61 2F 34 2E 30 20 28 63 6F 6D   Mozilla/4.0 (com
         70 61 74 69 62 6C 65 3B 20 4D 53 49 45 20 35 2E   patible; MSIE 5.
         30 31 3B 20 57 69 6E 64 6F 77 73 20 4E 54 20 35   01; Windows NT 5
         2E 30 29 0D 0A 48 6F 73 74 3A 20 31 39 32 2E 31   .0)..Host: 192.1
         36 38 2E 31 2E 32 30 30 0D 0A 43 6F 6E 6E 65 63   68.1.200..Connec
         74 69 6F 6E 3A 20 4B 65 65 70 2D 41 6C 69 76 65   tion: Keep-Alive
         0D 0A 0D 0A                                       ....

12:58:58 Packet from 216.32.74.53:80 to 192.168.1.13:54789
         48 54 54 50 2F 31 2E 30 20 32 30 30 20 4F 4B 0D   HTTP/1.0 200 OK.
         0A 43 6F 6E 74 65 6E 74 2D 4C 65 6E 67 74 68 3A   .Content-Length:
         20 31 34 38 30 30 0D 0A 43 6F 6E 74 65 6E 74 2D    14800..Content-
         54 79 70 65 3A 20 74 65 78 74 2F 68 74 6D 6C 0D   Type: text/html.
         0A 0D 0A 3C 68 74 6D 6C 3E 3C 68 65 61 64 3E 3C   ...<html><head><
         74 69 74 6C 65 3E 59 61 68 6F 6F 21 3C 2F 74 69   title>Yahoo!</ti
         74 6C 65 3E 3C 62 61 73 65 20 68 72 65 66 3D 68   tle><base href=h
         74 74 70 3A 2F 2F 77 77 77 2E 79 61 68 6F 6F 2E   ttp://www.yahoo.
         63 6F 6D 2F 3E 3C 6D 65 74 61 20 68 74 74 70 2D   com/><meta http-
         65 71 75 69 76 3D 22 50 49 43 53 2D 4C 61 62 65   equiv="PICS-Labe
         6C 22 20 63 6F 6E 74 65 6E 74 3D 27 28 50 49 43   l" content='(PIC
         53 2D 31 2E 31 20 22 68 74 74 70 3A 2F 2F 77 77   S-1.1 "http://ww
         77 2E 72 73 61 63 2E 6F 72 67 2F 72 61 74 69 6E   w.rsac.org/ratin
         67 73 76 30 31 2E 68 74 6D 6C 22 20 6C 20 67 65   gsv01.html" l ge
         6E 20 74 72 75 65 20 66 6F 72 20 22 68 74 74 70   n true for "http
         3A 2F 2F 77 77 77 2E 79 61 68 6F 6F 2E 63 6F 6D   ://www.yahoo.com
```

That's a bit of a data log file, where we can see that a client connection using Iexplorer v5 gets the homepage of Yahoo.

The first paragraph is the GET command of the client that is at 192.168.1.13 and the other is the response from web server.

An application Sample

Supose you have a scenary where you have a small LAN or SO/HO connected to the Internet by a unique NT box that has one Net IP address, but you want to allow the connection from outside to telnet, web and so to multiple boxes with different private IP addresses inside the LAN.

You have differents options to set up this system:

- Put a router with NAPT functionality (Network address port translation)
- Get more IP addresses, one of each diferent service machine, and a firewall.
- Put a reverse proxy.
- Put RelayTC Service on the NT public box.

Even the first three solutions lets you get more functionalty and be more flexible to add services, in a little environment we try to use RelayTCP. Let's see how is the solution with this service.

The summary of internal services which would be published are:

- The intranet web at server A 192.168.10.1 on port 80
- The Telnet service of a unix at server B 192.168.10.2 on port 23
- The internal news service at server C 192.168.10.3 on port 119

And the services we would get access from inside:

- SMTP and POP3 services of the ISP mail server 194.78.42.100 at outside net

The installation of RelayTCP Service will be on Gateway NT and should have a configuration like this:

- Listening on port 80 and relay to server A 192.168.10.1 port 80 (Web)
- Listening on port 23 and relay to server B 192.168.10.2 port 23 (Telnet)
- Listening on port 119 and relay to server C 192.168.10.3 port 119 (News)
- Listening on port 110 and relay to ISP mail 194.78.42.100 port 110 (POP3)
- Listening on port 25 and relay to ISP mail 194.78.42.100 port 25 (SMTP)

Then, remote workstations could connect to ports 80, 23, 119 of the gateway box and get Web, Telnet and news services from internal boxes.

Also any workstation and server could connect to services 25 and 110 of the gateway an get ISP mail services.
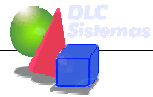
Note that all routes setup above are available both to internal and external nets because listening ports are equally bound to both interfaces.
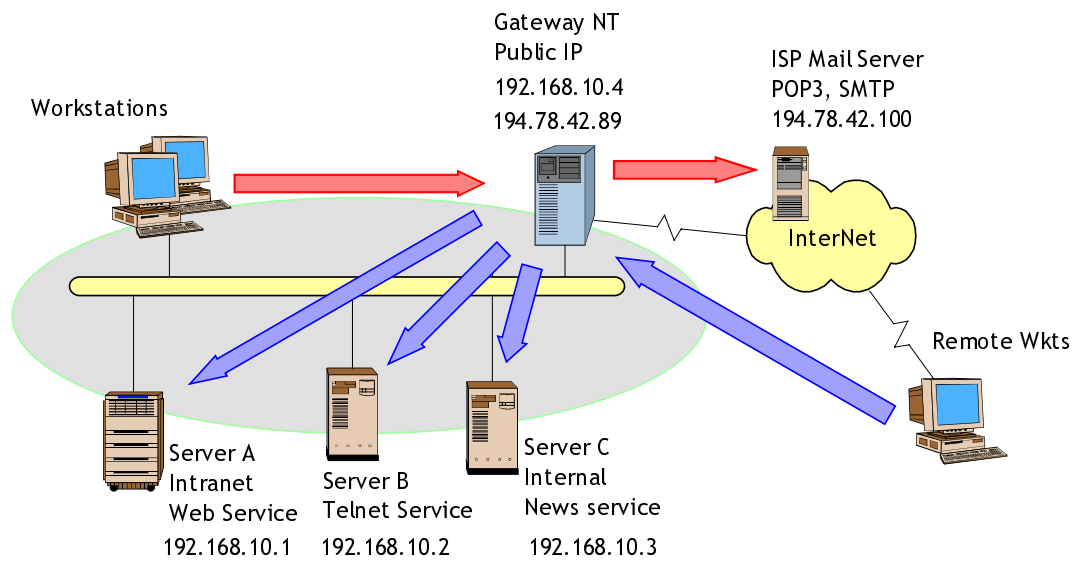
This sample has been done with one-port services, that is on services which ports are well-know and only uses them.

An internal service that doesn't work in this scenary is FTP, because it opens data port to send/receive file data and this ports are arbitrary.

Also services that uses UDP are not in the scope of this scenary because RelayTCP only forwards socket streams (TCP).

Service Considerations

Relay TCP Service supports up to 40 redirections.
This means that the service will listen up to 40 ports, but it can manage as many client connections as OS support.

Only OS memory and thread and socket resources will limit the number simultaneous connections.

The service spends the following resources for:

- 1 thread for the main process
- 1 thread for the object manager
- 1 thread for each listening socket
- 1 thread for each client connection
- 1 listening socket for each listening process
- 2 sockets for each client connection
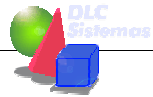- the memory needed to buffer data and objects.

The service retains all resources that were needed at peaks of work to optimize speed and use of memory.

At production environment is recommended to restart the service periodically (i.e. with an AT command at night running a kind of NET STOP/NET START batch script).

Final Notes

Relay TCP is a project in continuous development and improvement.
Please send us your opinions and also the result of your tests and experiences with this software.

Terms of Use

RelayTCP 1.0 – Socket forwarder
RelayTCPsvc 1.0 – Socket forwarder service
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